

# CANADIAN JOURNAL OF RESEARCH

VOLUME 17

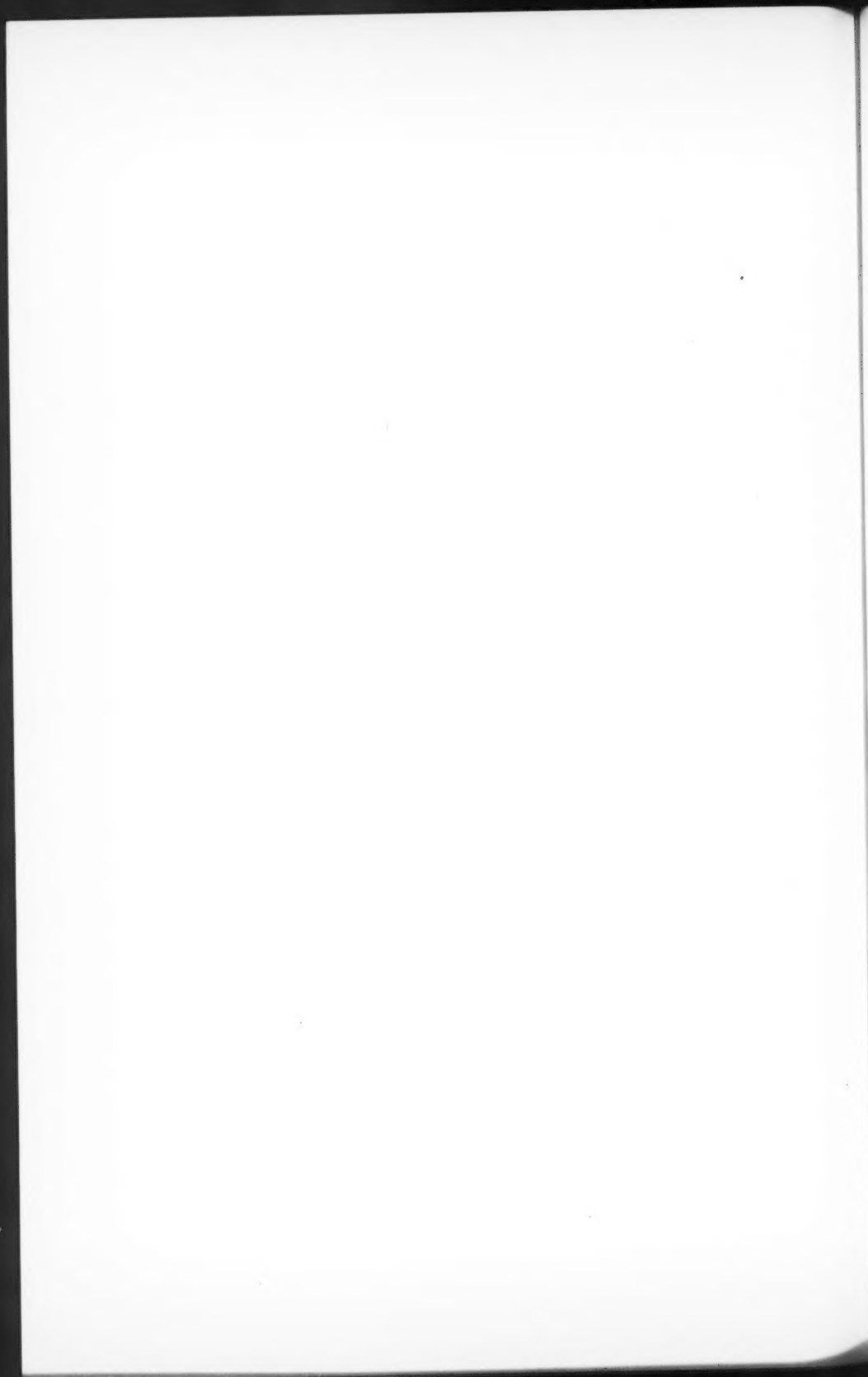
1939

SECTION B



CANADA

*Published by the*  
**NATIONAL  
RESEARCH COUNCIL**  
*of CANADA*



Section B

INDEX TO VOLUME 17

Authors

- Adams, A. B., Brown, R. S., Barnes, W. H., and Maass, O.**—A new vacuum adiabatic calorimeter, 341.
- Allen, C. F. H., Eliot, C. G., and Bell, A.**—2,3-Diphenylbutadiene-1,3, 75.
- Barnes, W. H.**—See Adams, A. B.
- Basterfield, S., Rodman, F. B. S., and Tomecko, J. W.**—Studies in isoureas and isoureides. V. The addition of dihydric and substituted alcohols to cyanamide, 390.
- Bayley, C. H.**—See Cambron, A.
- Beal, G. P.**—See McLaughlin, R. R.
- Bell, A.**—See Allen, C. F. H.
- Bigelow, H. E. and Steeves, W. H.**—The nitration of *m*-dichloroazoxybenzene and the reduction of some of the products, 160.
- Brechin, W. A.**—See Neish, A. C.
- Breckenridge, J. G. and Hodgins, J. W. R.**—Co-ordination compounds of 1 : 3-diamino-isopropanol, 331.
- Breckenridge, J. G., Lewis, R. W. J., and Quick, L. A.**—2-2'-Biquinolyl— a reagent for copper, 258.
- Brown, R. S.**—See Adams, A. B.
- Byers, H. G. and Lakin, H. W.**—Selenium in Canada, 364.
- Calhoun, J. M., Yorston, F. H., and Maass, O.**—A study of the mechanism and kinetics of the sulphite process, 121.
- Cambron, A.**—Synthesis of naphthyl-acetic acid, 10.
- Cambron, A. and Bayley, C. H.**—Vapour-phase cracking of gas-oil in baffled metal tubes, 23.
- Campbell, W. B.**—See Shipley, J. H., Wiggins, E. J.
- Clark, R. H.**—See Fisher, H. E.
- Dacey, J. R.**—See McIntosh, R. L.
- Dacey, J., McIntosh, R., and Maass, O.**—Note on persistence of liquid structure in the critical region, 145.  
Pressure, volume, temperature relations of ethylene in the critical region. I., 206.
- Deans, S. A. V.**—See Stevens, P. G.
- DeLong, W. A.**—See Smith, G. R.
- Dyer, W. J.**—See Smith, G. R., Wrenshall, C. L.
- Eliot, C. G.**—See Allen, C. F. H.
- Ferguson, J. B.**—See Janis, A. A., Sheffer, H.
- Finlay, G. R.**—See Shipley, J. W., Walker, O. J.
- Fisher, H. E. and Clark, R. H.**—The conversion of alpha-bromonaphthalene into the beta isomer, 251.
- Folkins, H. O.**—See Steacie, E. W. R.

- Griffin, F. P.**—See Parker, W. E.
- Guest, G. H.**—A note on the colorimetric determination of proline, 143.
- Guest, G. H.**—See McFarlane, W. D.
- Guest, G. H. and McFarlane, W. D.**—A study of the colorimetric determination of pyrrole with isatin and the application of the method to biological materials, 133.
- Harris, W. E.**—See Walker, O. J.
- Hodgins, J. W. R.**—See Breckenridge, J. G.
- Hopkins, C. Y.**—Note on the mounting of small metal specimens in resin plaques, 159.  
Starch content of certain wheats of the 1935 crop, 253.
- Janis, A. A.**—See Sheffer, H.
- Janis, A. A. and Ferguson, J. B.**—Sodium chloride solutions as an isopiestic standard, 215.
- Lakin, H. W.**—See Byers, H. G.
- Lawe, T.**—See Sturrock, M. G.
- Ledingham, A. E.**—See Manske, R. H. F.
- Lewis, R. W. J.**—See Breckenridge, J. G.
- Lusby, G. R. and Maass, O.**—The influence of temperature on the sorption of sodium hydroxide on wood, 36.
- Maass, O.**—See Adams, A. B., Calhoun, J. M., Dacey, J., Lusby, G. R., McIntosh, R. L., Shipley, J. H., Wiggins, E. J.
- McFarlane, W. D.**—See Guest, G. H., Neish, A. C.
- McFarlane, W. D. and Guest, G. H.**—A new colorimetric method for the determination of hydroxyproline and its application to gelatin hydrolyzates, 139.
- McIntosh, R.**—See Dacey, J.
- McIntosh, R. L., Dacey, J. R., and Maass, O.**—The effect of compression on the homogeneous systems ethylene and air-ethylene in the critical region, 231.  
Pressure, volume, temperature relations of ethylene in the critical region. II., 241.
- McLaughlin, R. R. and Beal, G. P.**—The role of copper in the deterioration of rubber, 61.
- Manske, R. H. F.**—  
The alkaloids of fumariaceae plants.  
XIX. *Corydalis ophiocarpa* Hook. f. et Thoms., 51.  
XX. *Corydalis micrantha* (Engelm.) Gray and *Corydalis crystallina* Engelm., 57.  
XXI. *Corydalis lutea* (L.) DC., 89.  
XXII. *Corydalis ochroleuca* Koch, 95.  
The alkaloids of papaveraceae plants.  
XXIII. Alkaloids of *Glaucium flavum* Crantz, 399.  
The alkaloids of *Senecio* species.  
III. *Senecio integerrimus*, *S. longilobus*, *S. spartioides* and *S. ridellii*, 1.  
IV. *Erechtites hieracifolia* (L.) Raf., 8.
- Manske, R. H. F. and Ledingham, A. E.**—A synthesis of  $\alpha$ -naphthyl-acetic acid and some homologues, 14.
- Manske, R. H. F. and Marion, L.**—Calycanthine. IV. A structural formula, 293.
- Marion, L.**—The occurrence of *l*-nicotine in *Asclepias syriaca* L., 21.
- Marion, L.**—See Manske, R. H. F.
- Munro, L. A. and Pearce, J. A.**—The time of set of silica gels.  
III. The changing effect of alcohols over a pH range, 266.  
IV. The effect of aldehydes and sugars over a pH range, 404.

- Neish, A. C., McFarlane, W. D., and Brechin, W. A.**—A modified procedure for the determination of carotene in silage, 325.
- Parker, W. E. and Griffin, F. P.**—Some observations on the determination of iron and copper in biological material by photoelectric colorimetry, 66.
- Parlee, N. A. D.**—See Steacie, E. W. R.
- Pearce, J. A.**—See Munro, L. A.
- Pidgeon, L. M.**—Studies of carbon black. V. The effect of gas composition on the production and properties of carbon obtained by non-impingement (lampblack) methods, 353.
- Quick, L. A.**—See Breckenridge, J. G.
- Rodman, F. B. S.**—See Basterfield, S.
- Rogers, M. T.**—See Shipley, J. W.
- Rose, A.**—A new type of silica tannage, 385.
- Sair, L. and Snell, J. F.**—Fractionation of the chloroform extract of maple syrup, 281.
- Sheffer, H., Janis, A. A., and Ferguson, J. B.**—The activity of water in sulphuric acid solutions at 25° C. by the isopiestic method, 336.
- Shipley, J. W. and Finlay, G. R.**—The corrosion of iron electrodes by a.c. in aqueous electrolytes, 99.
- Shipley, J. W. and Rogers, M. T.**—The electrolysis of some organic compounds with alternating current, 147.  
The production of ethane, quinhydrone, and potassium cupric cyanide by a-c. electrolysis, 167.
- Shipley, J. H., Campbell, W. B., and Maass, O.**—The heat content of water adsorbed on cellulose, 40.
- Smith, G. R., Dyer, W. J., Wrenshall, C. L., and DeLong, W. A.**—Further observations on the determination of phosphate by photoelectric colorimetry, 178.
- Snell, J. F.**—See Sair, L.
- Steacie, E. W. R. and Folkins, H. O.**—The kinetics of the decomposition reactions of the lower paraffins. IV. The role of free radicals in the decomposition of *n*-butane, 105.
- Steacie, E. W. R. and Parlee, N. A. D.**—The reaction of hydrogen and deuterium atoms with propane, 371.
- Steeves, W. H.**—See Bigelow, H. E.
- Stevens, P. G. and Deans, S. A. V.**—The preparation of ethers, 290.
- Sturrock, M. G. and Lawe, T.**—The systems chrysene-1 : 2-benzanthracene and 1 : 2-benzanthracene-triphenylene, 71.
- Tomecko, J. W.**—See Basterfield, S.
- Walker, O. J., Finlay, G. R., and Harris, W. E.**—The removal of fluorine from Alberta waters, 308.
- Wiggins, E. J., Campbell, W. B., and Maass, O.**—Determination of the specific surface of fibrous materials, 318.
- Wrenshall, C. L.**—See Smith, G. R.
- Wrenshall, C. L. and Dyer, W. J.**—A method for the determination of organic phosphorus in soils and soil extracts, 199.
- Wright, G. F.**—Microchemical technique. III. Semi-micro preparation and purification of organic substances, 302.
- Yorston, F. H.**—See Calhoun, J. M.
- Young, J. W.**—*s*-Diphenylguanidine as an acidimetric standard, 192.

— IV —

Section B

INDEX TO VOLUME 17

Subjects

- Acetaldehyde**, Effect of, on time of set of silica gels, 404.
- Acetamide-**,  $\alpha$ -Naphthyl-, 17.
- Acetic acid-**,  $\alpha$ -Naphthyl-, 10, 14.
- Acetone**  
A-c. electrolysis of, 153.  
Effect of, on time of set of silica gels, 404.
- Acetonitrile**,  $\alpha$ -Naphthyl-, 17.
- $\beta$ -Acetoxyethyl-isourea salts, 397.
- Acidimetric standard**, *s*-Diphenylguanidine as an, 192.
- Activity coefficient** of potassium chloride, Calculation of, 227.
- Activity of water** in sulphuric acid solutions at 25° C. by the isopiestic method, 336.
- Adiabatic calorimeter**, See Calorimeter.
- l*-Adlumine** from *Corydalis ophiocarpa*, 54.
- Air**, Effect of copper on rubber samples aged in, 61, 63.
- Air-ethylene** and ethylene, Effect of compression on the homogeneous systems, in the critical region, 231.
- Alberta waters**, Removal of fluorine from, 308.
- Alcohols**  
A-c. electrolysis of ethyl and *n*-propyl, 151.  
Dihydric and substituted, Addition of, to cyanamide, 390.  
Effect of, on the setting time of silica gels, 266.
- Aldehydes**, Effect of, on time of set of silica gels, 404.
- Alkalis**, See Sodium hydroxide.
- Alkaloid F39** (ophiocarpine) from *Corydalis ophiocarpa*, 51, 53.
- Alkaloid F40** from *Corydalis ophiocarpa*, 55.
- Alkaloid F41** from *Corydalis micrantha*, 59.
- Alkaloid F42** from *Corydalis micrantha*, 58.
- Alkaloid F43** from *Corydalis micrantha*, 58.
- Alkaloid F44** (luteanine) from *Corydalis lutea*, 91.
- Alkaloid F45** from *Corydalis ochroleuca*, 97.
- Alkaloid F46** from *Corydalis ochroleuca*, 98.
- Alkaloid F47** from *Glaucium flavum*, 399.
- Alkaloids**  
Calycanthine. IV. A structural formula, 293.  
*l*-Nicotine in *Asclepias syriaca* L., 21.  
of *Glaucium flavum*, 399.
- Alkaloids of fumariaceous plants**  
XIX. *Corydalis ophiocarpa* Hook. f. et Thoms., 51.  
XX. *Corydalis micrantha* (Engelm.) Gray and *Corydalis crystallina* Engelm., 57.  
XXI. *Corydalis lutea* (L.) DC., 89.  
XXII. *Corydalis ochroleuca* Koch, 95.
- Alkaloids of papaveraceous plants.**  
XXIII. Alkaloids of *Glaucium flavum* Crantz, 399.
- Alkaloids of Senecio species**  
III. *Senecio integerrimus*, *S. longilobus*, *S. spartioides* and *S. ridellii*, 1.  
IV. *Erechtites hieracifolia* (L.) Raf., 8.
- Alkyl-isoureas**, 390.
- $\alpha$ -Alloxyptopine from *Corydalis ophiocarpa*, 54.
- 2-Alloxy-barbituric acid**, Salt of allyl-isourea and, 393.
- 2-Alloxy-4-methyl-uracil**, 393.
- Allyl-isourea** and derivatives, 392.
- Alternating current electrolysis** of some organic compounds, 147.  
Production of ethane, quinhydrone, and potassium cupric cyanide by, 167.
- Aluminium oxide**, Removal of fluorine from Alberta waters by, 311.
- Aluminium phosphate**, Removal of fluorine from Alberta waters by, 308.
- $\beta$ -Amino-ethyl-isourea salts, 396.
- Ammonium thiocyanate**, A-c. electrolysis of, 153.
- Analysis**  
*s*-Diphenylguanidine as an acidimetric standard, 192.  
Microchemical technique. III. Semi-micro preparation and purification of organic substances, 302.

- Aniline**, A-c. electrolysis of, 152.
- Anthraquinone, 2,3-Diphenyl-**, 86.
- Apparatus** for semi-micro preparation and purification of organic substances, 302.
- Aromatic hydrocarbons**, A-c. electrolysis of, 151.
- Asclepias syriaca** L., The occurrence of *l*-nicotine in, 21.  
Neutral substance from, 22.
- Astragali** samples from Alberta, Saskatchewan, and Manitoba, Selenium in, 364.
- Aureine**, Identity with senecionine, 2.
- Aurotensine** from *Glaucium flavum*, 399.
- Barbituric acid**  
2-Alloxy-, 393.  
Salt of allyl-isourea and, 393.  
2-Cyclohexoxy-, 394.  
Salt of cyclohexyl-isourea and, 394.  
2-( $\beta$ -ethoxy-ethoxy)-, 396.  
Salt of  $\beta$ -ethoxy-ethyl-isourea and, 396.
- 1 : 2-Benzanthracene-triphenylene**,  
Liquidus-solidus curves of the system, 72.
- Benzene**, A-c. electrolysis of, 151.
- Benzoate**, Ethyl, Attempted reduction of, by a-c. electrolysis, 154.
- Benzoic acid, 3,4-Diphenyl-**, 86.
- 2-Benzoxy-4-methyl-uracil**, 394.
- Benzoylation** of calycanthine, 300.
- Benzyl-alcohol-hexane** system, Use of, in determination of carotene in silage, 325.
- Benzyl-isourea** and derivatives, 394.
- Berberine** from *Corydalis ophiocarpa*, 51, 55.
- Bicuculline** from  
*Corydalis crystallina*, 57.  
*Corydalis ochroleuca*, 96.
- Biological material**, Determination of iron and copper in, by photoelectric colorimetry, 66.
- 2 : 2'-Biquinolyl** — a reagent for copper, 258.  
Compounds with cobaltous, cupric, and cuprous salts, 264.
- 1 : 5-Bis-chloromethyl-naphthalene**, 16.
- Black spruce**, See Wood.
- Borax** as an acidimetric standard, Comparison of, with *s*-diphenylguanidine, 196.
- Bromination** of  
dimethylstilbenes, 87.  
2,3-diphenylbutadiene, 81.
- Bromine**, Addition to 2,3-diphenylbutadiene, 81.
- $\alpha$ -Bromonaphthalene**, Conversion of, into the  $\beta$ -isomer, 251.
- $\beta$ -Bromonaphthalene**, Conversion of  $\alpha$ -bromonaphthalene into, 251.
- Butadiene-1,3, 2,3-Diphenyl-**, Addition reactions of, 81.
- Butadiene, 2,3-Diphenyl-1,4-dinitro-**, 84.
- Butandiol-2,3, 2,3-Diphenyl-**, 80.
- n*-Butane**  
Decomposition of,  
Effect of ethylene oxide, 108.  
Inhibition of, by nitric oxide, 108.  
—ethylene-oxide—nitric-oxide mixtures,  
Decomposition of, 115.  
Role of free radicals in the decomposition of, 105.
- Butane-propane**, Production of carbon from, 356.
- Butanes, 2,3-Diphenyl-2,3-dibromo-**, 87.
- Butene-1, 2,3-Diphenyl-3,4-dinitro-**, 84.
- Butene-2, 2,3-Diphenyl-1,4-dibromo-**, 81.
- Butene-2, 2,3-Diphenyl-1,4-dinitro-**, 84.
- Butene-3, 2,3-Diphenyl-4-bromo-**, 82.
- iso*-Butyraldehyde**, Effect of, on time of set of silica gels, 404.
- n*-Butyraldehyde**, Effect of, on time of set of silica gels, 404.
- Butyric acid**, A-c. electrolysis of potassium salt of, 151.
- Calcium chloride** as inhibitor of corrosion of iron electrodes in a-c. electrolysis, 103.
- Calcium salts**  
Aqueous solutions of, Corrosion of iron electrodes by a.c. in, 99.  
as inhibitor of corrosion of iron electrodes, 103.
- Calorimeter**, Adiabatic  
A new type of, for measuring the heat capacity of water adsorbed on cellulose, 41.  
A new vacuum, 341.
- Calycanine** in degradation products of calycanthine, 300.

- Calycanthine.** IV. A structural formula, 293.  
 Degradation with selenium, 298.
- Calycanthus glaucus**, Calycanthine isolated from, 297.
- Calycanthus occidentalis**, Calycanthine isolated from, 297.
- Canada**, Selenium in, 364.
- I-Canadine** from *Corydalis ophiocarpa*, 51, 53.
- Capauridine** from *Corydalis micrantha*, 58.
- Capaurine** from *Corydalis micrantha*, 58.
- Capnoidine** from *Corydalis crystallina*, 59.
- n-Caproic acid**, A-c. electrolysis of potassium salt of, 151.
- Carbamate method** for copper, Combination of, with dipyriddy method for available iron, 66.
- Carbethoxy-methyl-isourea** salts, 397.
- 3-Carboline** in degradation products of calycanthine, 299.
- Carbon black**, Studies of. V. The effect of gas composition on the production and properties of carbon obtained by non-impingement (lampblack) methods, 353.
- Carotene** in silage, Modified procedure for the determination of, 325.
- Catalysts**, See Promoters.
- Celanese**, Kozeny equation applied to, 318.
- Cellulose**, Heat content of water adsorbed on, 40.
- Ceruleomolybdate** reaction for phosphate, 178, 199.
- Chloride** solutions, Corrosion of iron electrodes by a-c. electrolysis in, 100.  
 Protective action of magnesium chloride, 103.
- Chloroform** extract of maple syrup, Fractionation of the, 281.
- $\alpha$ -Chloromethyl-naphthalene**, 12, 15.
- Cholesterol**, methyl ether, Preparation by new modification of Williamson's ether synthesis, 292.
- Chromium**, See under Promoters.
- Chrysene-1 : 2-benzanthracene**, Liquidus-solidus curves of the system, 72.
- Cobaltous chloride**, Compound of, with 2 : 2'-biquinolyl, 264.
- Colorimetry**, See Photoelectric colorimetry.
- Compression** due to thermal expansion, Effect of, on density of ethylene and air-ethylene in critical region, 231.
- Constants, Critical**, of ethylene, as determined from pressure-volume isothermals, 247.
- Co-ordination compounds** of 2-2'-biquinolyl, 258.  
 1 : 3-diaminoisopropanol, 331.
- Copper**  
 and iron in biological material, Determination of, by photoelectric colorimetry, 66.  
 2 : 2'-Biquinolyl—a reagent for, 258.  
 Co-ordination compounds of 1 : 3-diaminoisopropanol with, 331.  
 Role of, in deterioration of rubber, 61.
- Copper sulphate**, Compound of, with 2 : 2'-biquinolyl, 264.
- Corrosion** of iron electrodes by a-c. in aqueous electrolytes, 99.  
 Protective coatings, 103.
- Corydalis crystallina** Engelm., Alkaloids isolated from, 57.
- Corydalis lutea**, Alkaloids isolated from, 89.
- Corydalis micrantha** (Engelm.) Gray, Alkaloids isolated from, 57.
- Corydalis ochroleuca**, Alkaloids isolated from, 95.
- Corydalis ophiocarpa** Hook. f. et Thoms., Alkaloids isolated from, 51.
- I-Corypalmine** from  
*Corydalis ochroleuca*, 97.  
*Corydalis ophiocarpa*, 55.
- Cracking of gas-oil** in baffled metal tubes, Vapour-phase, 23.  
 Recirculation, 33.  
 Single pass, 26.
- Critical constants** of ethylene as determined from pressure-volume isothermals, 247.
- Critical region**  
 Effect of compression on the homogeneous systems ethylene and air-ethylene in the, 231.  
 Persistence of liquid structure in, 145.  
 Pressure, volume, temperature relations of ethylene in the, 206, 241.
- Cryptocavine** from *Corydalis ophiocarpa*, 54.
- Cupric chloride**, Compound of, with 2 : 2'-biquinolyl, 264.



- Cuprous chloride**, Compound of, with 2 : 2'-biquinolyl, 264.
- Current density**, Influence of, on the solution of copper electrodes in potassium cyanide, 173.
- Cyanamide**, Addition of dihydric and substituted alcohols to, 390.
- 2-Cyclohexoxy-barbituric acid**, 394.  
Salt of cyclohexyl-isourea and, 394.
- 2-Cyclohexoxy-4-methyl-uracil**, 394.
- Cyclohexyl-isourea** and derivatives, 393.  
Salt of 2-cyclohexoxy-barbituric acid and, 394.
- Decomposition of *n*-butane**, Role of free radicals in, 105.
- Delignification of spruce wood**  
and yield of pulp, Effect of temperature on the rate of, 123.  
Temperature coefficient of, 125, 129.
- Density** of systems ethylene and air-ethylene in critical region, Effect of compression, due to thermal expansion on, 231.
- Deuterium** and hydrogen atoms, Reaction of, with propane, 371.
- Dextrose**, Effect of, on time of set of silica gels, 404.
- Diacetone alcohol**, Effect of, on time of set of silica gels, 404.
- 1 : 3-Diaminoisopropanol**, Co-ordination compounds of, 331.
- m*-Dichloroazoxybenzene**  
Azobisazoxy and trisazoxy derivatives, 162, 164.  
Nitration, and reduction of products, 160, 163.  
Preparation of, 163.
- Diene synthesis** with 2,3-diphenylbutadiene-1,3, 85.
- Dihydric alcohols**, Addition of, to cyanamide, 390.
- Dimethylstilbenes**, Bromination of the, 87.
- Di- $\alpha$ -naphthyl-methyl ether**, 17.
- 2,3-Diphenylantraquinone**, 86.
- 3,4-Diphenylbenzoic acid**, 86.
- 2,3-Diphenyl-4-bromobutene-3**, 82.
- 2,3-Diphenylbutadiene-1,3**, Addition reactions, 75.  
Bromides, 81.  
Coupling, 85.  
Diene synthesis, 85.  
Nitrogen dioxide, 84.  
Other addends, 87.  
Reduction, 83.
- 2,3-Diphenylbutandiol-2,3**, 80.
- 2,3-Diphenyl-2,3-dibromobutanes**, 87.
- 2,3-Diphenyl-1,4-dibromobutene-2**, 81.
- 2,3-Diphenyl-1,4-dinitrobutadiene**, 84.
- 2,3-Diphenyl-1,4-dinitrobutene-2**, 84.
- 2,3-Diphenyl-3,4-dinitrobutene-1**, 84.
- s*-Diphenylguanidine**  
as an acidimetric standard, 192.  
Comparison with sodium carbonate and borax, 196.
- 3,4-Diphenylphthalic acid**, 86.
- cis*-4,5-Diphenyltetrahydrophthalic acid**, 85.
- trans*-4,5-Diphenyltetrahydrophthalic acid**, 85.
- Dipyridyl method** for available iron in plant tissues,  
Combination of, with carbamate method for copper, 66.  
Modification of, 66.
- Electrodes**, Iron, Corrosion of, by a.c. in aqueous electrolytes, 99.
- Electrolysis**  
A-c., Production of ethane, quinhydrone, and potassium cupric cyanide by, 167.  
of some organic compounds with alternating current, 147.
- Electrolytes**, Aqueous, Corrosion of iron electrodes by a.c. in, 99.  
Protective coatings, 103.
- Erechtites hieracifolia* (L.) Raf.**, Alkaloids from, 8.
- Erythritol**, Effect of, on time of set of silica gels, 268.
- Ethane**  
-methane  
Production of carbon from, 356.  
Production of, from potassium acetate, by a-c. electrolysis, 168.
- Ethanol**, Effect of, on time of set of silica gels, 268.
- Ethanolamine**, A new isourea from reaction of cyanamide and, 396.
- Ether synthesis**, Williamson's, A new modification of, 290.
- 2-( $\beta$ -Ethoxy-ethoxy)-4-methyl-uracil**, 396.
- $\beta$ -Ethoxy-ethyl-isourea** salts and derivatives, 395.  
Salt of 2-( $\beta$ -ethoxy-ethoxy)-barbituric acid and, 396.

**Ethyl alcohol**

A-c. electrolysis of, 151.

Iodoform from, by the use of a-c. electrolysis, 153.

**Ethyl benzoate**, Attempted reduction of, by a-c. electrolysis, 154.

**Ethylene**

and air-ethylene, Effect of compression on the homogeneous systems, in the critical region, 231.

Critical constants of, as determined from pressure-volume isothermals, 247.

in the critical region, Pressure, volume, temperature relations of, 206, 241.

Lampblack from, 353.

Vapour pressure of, 247.

**Ethylene glycol**, A new isourea from reaction of cyanamide and, 395.

**Ethylene oxide**

Decomposition of, Effect of nitric oxide on, 114.

-nitric-oxide-butane mixtures, Decomposition of, 115.

Sensitized decomposition of butane by, at 450° C., 109.

**Ethyl glycollate**, A new isourea from reaction of cyanamide and, 390.

**$\beta$ -Ethyl-indole** in degradation products of calycanthine, 298.

**Ethyl lactate**, Methyl ether, Preparation by new modification of Williamson's ether synthesis, 292.

**Ethyl orthosilicate**, Tanning action of, 385.

**Fibres**, Specific surface of, 318.

**Fibrous materials**, Determination of the specific surface of, 318.

**Flour yield**, starch content, and protein content of Western Canadian wheats (1935 crop), Comparison of, 255.

**Fluorine**, Removal of, from Alberta waters, 308.

**Formaldehyde**, Effect of, on time of set of silica gels, 404.

**Fractionation** of the chloroform extract of maple syrup, 281.

**Freezing points**, See *Liquidus-solidus* curves.

**Fumariaceous plants**, See Alkaloids of,

**Galactose**, Effect of, on time of set of silica gels, 404.

**Garnet wheat** (1935 crop), Starch and protein content of, 256.

**Gas**, Qualitative description of transition from liquid to, 249.

**Gas-oil**, Vapour-phase cracking of, in baffled metal tubes, 23.

**Gasoline**, 205° End-point, Yield of, from vapour-phase cracking of gas-oil in baffled and unbaffled metal tubes, 29, 33.

**Gelatin hydrolyzates**, Determinations of hydroxyproline in, 142.

**Gels**, Silica, Time of set of, 266, 404.

**Glass wool**, Kozeny equation applied to, 318.

**Glaucine** from *Glaucium flavum*, 401.

**Glaucium flavum**, Alkaloids of, 399.

**Glycerol**, Effect of, on time of set of silica gels, 268.

**Glycol**, Effect of, on time of set of silica gels, 268.

**Glycol mono-acetate**, A new isourea from reaction of cyanamide and, 390.

**Glycol mono-ethyl ether**, A new isourea from reaction of cyanamide and, 395.

**Heat**, A new vacuum adiabatic calorimeter, 341.

See Thermal conductivity.

**Heat content** of water adsorbed on cellulose, 40.

**Hexane-benzyl-alcohol system**, Use of, in determination of carotene in silage, 325.

**Hexanol-2**, Methyl ether, Preparation by new modification of Williamson's ether synthesis, 290.

**Hexoic acid**,  $\epsilon$ -(1-Naphthyl)-, 19.

**Hieracifoline**, Alkaloid from *Erechtites hieracifolia* (L.) Raf., 8.

**Hieracinecic acid**, 8.

**Hydrocarbons**, Aromatic, A-c. electrolysis of, 151.

**Hydrogen** and deuterium atoms, Reaction of, with propane, 371.

**Hydrogen bromide**, Addition to 2,3-diphenylbutadiene, 82.

**Hydrogen-ethylene-methane**, Production of carbon from, 358.

**Hydrogen ion concentration**, Effect of, on time of set of silica gels, 266, 404.

**Hydrolysis** of hieracifoline, 9.

### Hydroquinone

A-c. electrolysis of, 152.

Production of quinhydrone from, by a-c. electrolysis, 169.

$\beta$ -Hydroxyethyl-isourea salts, 395.

*m*-Hydroxyphenyl-isourea salts, 397.

**Hydroxyproline**, Colorimetric method for the determination of, 139.

**Indene, 3-Methyl-2-phenyl-**, 82.

**Integerrimine**, A new alkaloid of *Senecio integerrimus*, 1,5.

**Integerrinecic acid**, 5.

**Iodoform** from ethyl alcohol by the use of a-c. electrolysis, 153.

**Iron** and copper in biological material, The determination of, by photoelectric colorimetry, 66.

**Iron electrodes**, Corrosion of, by a.c. in aqueous electrolytes, 99.  
Protective coatings, 103.

**Iron salts**, Aqueous solutions of, Corrosion of iron electrodes by a.c. in, 99.

**Isatin**, Colorimetric determination of pyrrole with, 133.

**Isochore** of system ethylene in critical region, 241.

**Isocorydine** from  
*Corydalis lutea*, 92.  
*Glaucium flavum*, 399.

***l*-Isocorypalmine** from  
*Corydalis lutea*, 93.  
*Corydalis ochroleuca*, 96.

**Isopestic concentration** of potassium chloride solutions, 223.

**Isopestic method**, Activity of water in sulphuric acid solutions at 25° C. by the, 336.

**Isopestic standard**, Sodium chloride solutions as an, 215.

### Isothermals

of the one component system ethylene in critical region, 241.

Pressure, of system ethylene in critical region, 206.

**Isoureas and isoureides**, Studies in, V.  
The addition of dihydric and substituted alcohols to cyanamide, 390.

**Kerosene**, Vapour-phase cracking of, 23.

### Kinetics

of the decomposition reactions of the lower paraffins. IV. The role of free radicals in the decomposition of *n*-butane, 105.  
of the sulphite process, A study of the mechanism and, 121.

**Kozeny equation** applied to the determination of the specific surface of fibrous materials, 318.

**Laboratory technique**, See Microchemical technique.

### Lampblack

from ethylene, methane, propane and mixtures of these gases, 353.

Reinforcement of rubber by, 358.

**Lepidine** in degradation products of calycanthine, 299.

**Levulose**, Effect of, on time of set of silica gels, 404.

**Lignin-like fraction** of the chloroform extract of maple syrup, 287.

**Linalool**, methyl ether, Preparation by new modification of Williamson's ether synthesis, 290.

**Liquid** to gas, Qualitative description of transition from, 249.

**Liquid structure**, Persistence of, in the critical region, 145.

### Liquidus-solidus curves for

1 : 2-Benzanthracene triphenylene, 73.

Chrysene-1 : 2-benzanthracene, 72.

**Longilobine**, A new alkaloid from *Senecio* species, 5.

**Longinecic acid**, 6.

### Luteanine (F44) from

*Corydalis lutea*, 91.

*Glaucium flavum*, 401.

**Magnesium chloride** and sulphate, as inhibitors of corrosion of iron electrodes in a-c. electrolysis, 103.

**Magnesium salts**, Aqueous solutions of, Corrosion of iron electrodes by a.c. in, 99.

**Malonate, Potassium ethyl**, A-c. electrolysis of, 153.

**Maltose**, Effect of, on time of set of silica gels, 404.

**Mannitol**, Effect of, on time of set of silica gels, 268.

**Mannose**, Effect of, on time of set of silica gels, 404.

- Maple syrup**, Fractionation of the chloroform extract of, 281.
- Marquis wheat** (1935 crop), Starch and protein content of, 256.
- Melting points** and freezing points of the systems chrysene-1 : 2-benzanthracene and 1 : 2-benzanthracene-triphenylene, 72, 73.
- Metals** as promoters in conversion of  $\alpha$ -bromonaphthalene into the  $\beta$ -isomer, 251.
- Metal specimens**, Small, Mounting of, in resin plaques, 159.
- Methane**, Lampblack from, 353.
- Methanol**, Effect of, on time of set of silica gels, 268.
- Methyl ethers**, Preparation of, by a new modification of Williamson's ether synthesis, 290.
- Methyl  $\alpha$ -naphthyl-methyl ether**, 17.
- Methyl orthosilicate**, Tanning action of, 385.
- 3-Methyl-2-phenylindene**, 82.
- 2-Methyl-propanol-2**, methyl ether, Preparation by new modification of Williamson's ether synthesis, 290.
- Microchemical technique**, III. Semi-micro preparation and purification of organic substances, 302.  
Microdistillation flask, 306.  
Side-arm test tube, 304.  
Solubility tests, 302.  
Suction funnel, 305.
- Micro-colorimetric method** for pyrrole as pyrrole blue, 133.
- Microdistillation flask** used in semi-micro preparation and purification of organic substances, 306.
- Moisture content** of sodium and potassium chlorides, 219, 220.
- Molybdenum**, See under Promoters.
- Mottled enamel**, Removal of fluorine causing, from Alberta waters, 308.
- Naphthalene**  
1 : 5-Bis-chloromethyl-, 16.  
 $\alpha$ -Chloromethyl-, 12, 15.  
Sodium, Use of, in new modification of Williamson's ether synthesis, 290.
- Naphthalene,  $\alpha$ -Bromo-**, Conversion of, into  $\beta$ -isomer, 251.
- Naphthalene,  $\beta$ -Bromo-**, Conversion of  $\alpha$ -bromonaphthalene into, 251.
- $\alpha$ -Naphthyl-acetamide**, 17.
- $\alpha$ -Naphthyl-acetic acid**  
and some homologues, A synthesis of, 14, 18.  
Preparation of, 12.
- $\alpha$ -Naphthyl-acetonitrile**, 17.
- $\alpha$ -Naphthyl-carbinol**, 17.
- $\alpha$ -Naphthyl-carbinyl acetate**, 17.
- Naphthylene-1 : 5-diacetic acid**, 16.
- Naphthylene-1 : 5-diacetonitrile**, 16.
- $\epsilon$ -(1-Naphthyl)-hexoic acid**, 19.
- $\alpha$ -Naphthyl-methyl ether**,  
Di-, 17.  
Methyl, 17.
- $\delta$ -(1-Naphthyl)-valeric acid**, 19.
- Nickel**, See under Promoters.
- l*-Nicotine**, The occurrence of, in *Asclepias syriaca* L., 21.
- Nitrates**, Reduction of, with a-c. electrolysis, 154.
- Nitration** of *m*-dichloroazoxybenzene and reduction of some of the products, 160.
- Nitric oxide**  
-butane-ethylene-oxide mixtures, Decomposition of, 115.  
Effect of, in decomposition of,  
butane, 108.  
ethylene oxide, 114.
- o*-Nitrobenzoic acid**, A-c. electrolysis of, 154.
- m*-Nitrobenzyl-isourea** and salts, 394.
- o*-Nitro-*m*-dichloroazoxybenzene**  
Preparation, 160, 163.  
Reduction, 163, 165.
- p*-Nitro-*m*-dichloroazoxybenzene**  
Preparation, 160, 163.  
Reduction, 164.
- Nitrogen**, Effect of copper on rubber samples aged in, 61, 64.
- Nitrogen dioxide**, Addition to 2,3-diphenylbutadiene, 84.
- Norharman** in degradation products of calycanthine, 299.
- Ochrobirine (F14)** from  
*Corydalis lutea*, 93.  
*Corydalis ochroleuca*, 97.

- Olefines**, Production of carbon from, 353.
- Ophiocarpine** from *Corydalis ophiocarpa*, 51.
- Oxalic acid**, sodium salt, Oxidation of, by a-c. electrolysis, 152.
- Oxidation** of senecic acid, 4.
- Oxidation by a-c. electrolysis** of hydroquinone, 168.  
potassium acetate, 167.
- Oxides**, Removal of fluorine from water by, 313.
- Palladium**, Treatment of calycanthine with, 300.
- Papaveraceous plants**, Alkaloids of, XXIII. *Glaucium flavum* Crantz, 399.
- Paraffins**  
Lower, Kinetics of the decomposition reactions of the, IV. The role of free radicals in the decomposition of *n*-butane, 105.  
Production of carbon from, 353.
- Paraformaldehyde**, Effect of, on time of set of silica gels, 404.
- Paraldehyde**, Effect of, on time of set of silica gels, 404.
- Partition coefficient** of carotene and other pigments in the system hexane-benzyl-alcohol, 325.
- Petroleum** fractions, Heavy, Vapour-phase cracking of, 23.
- 2-Phenylethoxy-4-methyl-uracil** (?), 395.
- Phenylethyl-isourea** and derivatives, 395.
- Phosphate**, Determination of, by photoelectric colorimetry, 178, 199.
- Phosphates**, Removal of fluorine from water by, 313.
- Phosphorus**, Organic, in soils, A method for the determination of, 178, 199.
- Photoelectric colorimetry**  
Determination of  
carotene in silage, 325.  
copper with 2 : 2'-biquinolyl, 258.  
hydroxyproline, 139.  
phosphorus, Organic, in soils and soil extracts, 178, 199.  
proline, 143.  
pyrrole in distillation products of various substances, 133.
- Phthalic acid**,  
3,4-Diphenyl-, 86.  
*cis*- and *trans*-4,5-Diphenyltetrahydro-, 85.
- Piperidine**, Reduction of pyridine to, by a-c. electrolysis, 154.
- Plant growth promoters** and substances for initiating root formation. Synthesis of  $\alpha$ -naphthyl-acetic acid, 10.
- Plant hormones**. Synthesis of  $\alpha$ -naphthyl-acetic acid, 10, 14.
- Plants**  
Alkaloids of fumariaceous, 51, 57, 89, 95.  
Alkaloids of papaveraceous, 399.  
Canadian, Selenium in, 364.  
Chemical examination of, as an aid to classification, 1, 51, 57, 89, 95, 399.
- Plant tissues**, Simultaneous determination of iron and copper in, 66, 67.
- Plaques**, Resin, Mounting small metal specimens in, 159.
- Polymerization** of thiosulphate by a-c. electrolysis, 152.
- Potassium acetate**  
A-c. electrolysis of, 149.  
Production of ethane from, by a-c. electrolysis, 168.
- Potassium butyrate**, A-c. electrolysis of, 151.
- Potassium *n*-caproate**, A-c. electrolysis of, 151.
- Potassium chloride**  
Calculation of activity coefficient of, 227.  
—sodium chloride system, Vapour pressures of, 215.  
solutions, Isopiestic concentration of, 223.  
Water content of, 220.
- Potassium cupric cyanide** formed by the a-c. electrolysis of an aqueous solution of potassium cyanide using copper electrodes, 173.
- Potassium cyanide**, Potassium cupric cyanide formed by the a-c. electrolysis of, using copper electrodes, 173.
- Potassium ethyl malonate**, A-c. electrolysis of, 153.
- Potassium permanganate** solution, Corrosion of iron electrodes by a.c. in, 100.
- Potassium propionate**, A-c. electrolysis of, 150.
- Pressure**, volume, temperature relations of ethylene in the critical region, 206, 241.
- Proline**, Colorimetric determination of, 143.
- Promoters** in conversion of  $\alpha$ -bromonaphthalene into the  $\beta$ -isomer (antimony, molybdenum, selenium, nickel, tungsten, chromium), 251.

**Propane**

Lampblack from, 353.

Reaction of hydrogen and deuterium atoms with, 371.

**n-Propanol**, Effect of, on time of set of silica gels, 268.

**Propanol-2**, methyl ether, Preparation by new modification of Williamson's ether synthesis, 290.

**Propionaldehyde**, Effect of, on time of set of silica gels, 404.

**Propionic acid**, A-c. electrolysis of potassium salt of, 150.

**n-Propyl alcohol**, A-c. electrolysis of, 151.

**Proteinaceous substances**, Determination of pyrrole obtained on dry distillation of, 136.

**Protein content**, starch content, and flour yield of Western Canadian wheat (1935 crop), Comparison of, 255.

**Protopine** from

Corydalis crystallina, 59.

Corydalis lutea, 93.

Corydalis micrantha, 59.

Corydalis ochroleuca, 97.

Corydalis ophiocarpa, 54.

Glaucium flavum, 399.

**Pulp**, Sulphite, Heat content of water adsorbed on, 40.

**Pyridine**, Reduction of, to piperidine by a-c. electrolysis, 154.

**Pyrrole**

Determination of, in the decomposition products of biological materials, 136.

Improved micro-colorimetric method for determination of, as pyrrole-blue, 133.

**Pyrrolysis**, See Vapour-phase cracking.

**Quinhydrone**, Production of, from hydroquinone, by a-c. electrolysis, 169.

**Quinoline**, in degradation products of calycanthine, 301.

**Radicals**, Free, in the decomposition of *n*-butane, 105.

**Reduction** of

products of nitration of *m*-dichloroazoxybenzene, 162, 164.

pyridine, nitrates, and ethyl benzoate by a-c. electrolysis, 154.

**Resin plaques**, Mounting small metal specimens in, 159.

**Resorcinol**, A new isourea from reaction of cyanamide and, 390.

**Retronecine** from hydrolysis of alkaloids from *Senecio* species, 1, 8.

**Rhamnose hydrate**, Effect of, on time of set of silica gels, 404.

**Ridelliine**, A new alkaloid from *Senecio* species, 1, 7.

**Rubber**

Reinforcement of, by lampblack, 358.

Role of copper in deterioration of, aged in air and in nitrogen, 61, 63, 64.

**Scoulerine** from *Corydalis micrantha*, 59.

**Selenium**

Degradation of Calycanthine with, 298.

in Canada, 364.

See under Promoters.

**Senecic acid**

Oxidation of, 4.

Structural formula for, 1.

**Senecionine**

Alkaloid from

*Senecio integerrimus*, 1.

*S. pseudo-arnica*, 2, 5.

Identity with aureine, 2.

**Senecio species**, Alkaloids of

*S. integerrimus*, 1, 4.

*S. longilobus*, 1, 5.

*S. pseudo-arnica*, 5.

*S. ridellii*, 1, 7.

*S. spartioides*, 1, 6.

**Senecio species**

Chemical examination of, as an aid to botanical classification, 1.

See also Alkaloids of *Senecio* species.

**Seneciophylline**, An alkaloid from *Senecio spartioides*, 1.

**Silage**, Modified procedure for the determination of carotene in, 325.

**Silica gels**, Time of set of

III. The changing effect of alcohols over a pH range, 266.

IV. Effect of aldehydes and sugars over a pH range, 404.

**Silica tannage**, A new type of, 385.

**Silver**, Co-ordination compounds of 1 : 3-diaminoisopropanol with, 331.

**Skatole** in degradation products of calycanthine, 298.

**Sodium arsenite**, Reduction of nitro derivatives of *m*-dichloroazoxybenzene with, 160.

- Sodium bicarbonate** solutions, Corrosion of iron electrodes by a.c. in, 100.
- Sodium carbonate** as an acidimetric standard, Comparison of, with *s*-diphenylguanidine, 196.
- Sodium chloride**  
and of sulphuric acid, Isopiestic molalities of solutions of, at 25° C., 338.  
-potassium chloride system, Vapour pressures of, 215.  
solutions as an isopiestic standard, 215.  
Water content of, 219.
- Sodium hydrogen phosphate, Di-**, solution, Corrosion of iron electrodes by a.c. in, 100.
- Sodium hydroxide**  
Influence of temperature on the sorption of, on wood, 36.  
solution, Corrosion of iron electrodes by a.c. in, 100.
- Sodium naphthalene**, Use of, in new modification of Williamson's ether synthesis, 290.
- Sodium oxalate**, Oxidation of, by a.c. electrolysis, 152.
- Sodium salts**, Aqueous solutions of, Corrosion of iron electrodes by a.c. in, 99.
- Sodium thiosulphate**, Polymerization of, by a.c. electrolysis, 152.
- Soils**  
and soil extracts, Determination of organic phosphorus in, 199.  
Canadian, Selenium in, 364.
- Solubility tests**, Microchemical, 302.
- Sorbitol**, Effect of, on time of set of silica gels, 268.
- Sorption**, Heat content of water adsorbed on cellulose, 40.
- Spartioidine**, A new alkaloid from *Senecio spartioides*, 1, 6.
- Specific heat**  
A new adiabatic calorimeter, 341.  
of water adsorbed on cellulose, Variation of, with percentage adsorbed, 48.
- Specific surface** of fibrous materials, Determination of, 318.
- Spruce**, See Wood.
- Starch content**, protein content, and flour yield of Western Canadian wheat (1935 crop); Comparison of, 253.
- Stilbenes, Dimethyl-**, Bromination of the, 87.
- l*-Stylopine** from *Corydalis lutea*, 92.
- Sucrose**, Effect of, on time of set of silica gels, 404.
- Sugars**, Effect of, on time of set of silica gels, 404.
- Sulphate solutions**, Corrosion of iron electrodes, by a.c. in, 100.
- Sulphite process**, A study of the mechanism and kinetics of, 121.
- Sulphite pulp**, Heat content of water adsorbed on, 40.
- Sulphuric acid** solutions at 25° C., Activity of water in, by the isopiestic method, 336.
- Surface, Specific**, of fibrous materials, Determination of, 318.
- Tannage**, Silica, A new type of, 385.
- Taxonomic classification**, Chemical examination of plants as an aid to, 1, 51, 57, 89, 95, 399.
- Teeth**, Mottled, Removal of fluorine in Alberta waters causing, 308.
- Temperature**  
Effect of, on  
a.c. electrolysis of hydroquinone, 170.  
ceruleomolybdate reaction for phosphate, 185.  
sorption of sodium hydroxide on wood, 36.  
the rate of delignification of spruce wood and yield of pulp in calcium-base sulphite liquor, 122.  
Heat content, at various temperatures, of water adsorbed on cellulose, 45 et seq.  
pressure, volume relations of ethylene in the critical region, 206, 241.
- Tetrachloroazobisazoxybenzene**, 162.
- Tetrachlorotrisazoxybenzene**, 162.
- l*-Tetrahydro-palmitine** from  
*Corydalis lutea*, 92.  
*Corydalis micrantha*, 58.  
*Corydalis ochroleuca*, 96.
- Thermal decomposition of *n*-butane**,  
Role of free radicals in, 105.
- Thiosulphate, Sodium**, Polymerization of, by a.c. electrolysis, 152.
- Thiourea**, A.c. electrolysis of, 152.
- Thymol**, Iodination of, by the use of a.c. electrolysis, 153.
- Time of set of silica gels**, 266, 404.



**Tricalcium phosphate**, Removal of fluorine from water by, 308.

**Tungsten**, See under Promoters.

**Uracil, 4-Methyl-**

2-Alloxy-, 393.

2-Benzoxo-, 394.

2-Cyclohexoxy-, 394.

2- $\beta$ -(ethoxy-ethoxy)-, 396.

2-Phenylethoxy-, 395.

**Vacuum adiabatic calorimeter**, A new, 341.

**Valeric acid**,  $\delta$ -(1-Naphthyl)-, 19.

**Vapour-phase cracking** of gas-oil in baffled metal tubes, 23.

Recirculation, 33.

Single pass, 26.

**Vapour pressure(s)**

curve for aqueous sodium chloride, 223.

of aqueous solutions of non-volatile salts, Method for accurate determination of, 215.

of ethylene, 247.

**Viscosity**, Relative, of solutions of rubber containing copper, as a measure of deteriorating action, 61, 62.

**Volume**, temperature, pressure relations of ethylene in the critical region, 206, 241.

**Water(s)**

Activity of, in sulphuric acid solutions at 25° C. by the isopiestic method, 336.

adsorbed on cellulose, Heat content of, 40.

Alberta, Removal of fluorine from, 308.

content of sodium and potassium chlorides, 219, 220.

**Wheats**, Western Canadian (1935 crop), Comparison of starch content, protein content, and flour yield of, 255.

**Williamson's ether synthesis**, Preparation of ethers by a new modification of, 290.

**Wood**

Black spruce, Effect of temperature on sorption of sodium hydroxide on, 36.

Spruce, Effect of temperature on the yield of pulp and on the rate of delignification of, 123.

**Xanthophyll** in silage, 326.

**"X" pigment** in silage, 326.

**p-Xylene**, A-c. electrolysis of, 151.

**Xylose**, Effect of, on time of set of silica gels, 404.

**Zinc**, Co-ordination compounds of 1:3-diaminoisopropanol with, 331.

## Errata

Page 53, second paragraph under "Experimental", third line, for "ophiocarpine (F40)" read "ophiocarpine (F39)", and for "alkaloid F39" read "alkaloid F40".

Page 318, third line of abstract, for "glass, wool and celanese" read "glass wool and celanese".

Page 318, third paragraph, first line, for "k" read "K".



